STATUS OF CLAIMS

Claims 1, 3, 5, 7, 9, 11 and 13-18 are pending in the application.

Claims 1, 3, 5, 7, 9, 11 and 13-18 are rejected.

The action is non-final.

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SUMMARY OF OFFICE ACTION

DETAILED ACTION

RCE Continued Examination Under 37 CFR 1.114

1. The Examiner states: "A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/27/2009 has been entered."

2. The Examiner states: "In view of amendments, the Examiner withdraws the rejection under 35 USC 103(a) to claims 1,3,5,7,9,11 and 13-18. However, claims 1,3,5,7,9,11 and 13-18 are not in a condition for allowance in view of new ground of rejection."

Claim Rejections - 35 USC § 112

3. The Examiner states: "Claims 3, 5, 9, 13, 15 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

For claim 3, "temperature range of the cryogenic liquid turbine generator" and "condition for operative" are indefinite. Therefore, the comparison is indefinite. For purpose of examination, the examiner regards the temperature range of the cryogenic liquid turbine generator is 180 degrees C and condition for operative is less than 1% of linear expansion.

For claims 5, 9, 13, 15 and 17, the claims refers 'the spacer', which is indefinite since said 'the spacer' has not been defined in respective parent claims."

Claim Rejections - 35 USC § 103

4. The Examiner states: "Claims 1,3,5,7,9,11 and 13-18 are rejected under 35 U.S.C. 103(a) as being

unpatentable over AAPA (applicant admitted prior art) in view of Nakamura (US 6,433,457) and in further view of Brown et al (US 6,261,455).

As for claim 1, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid turbine generator having main product-lubricated bearings separated by a span of shaft and a thrust equalizing mechanism adjacent one of said main bearings, the lubricated bearings having bearing blocks, the thrust mechanism comprising a thrust plate, variable orifice and fluid chamber, the fluid chamber fluidically coupled to the variable orifice (preamble of Jepson type claim is considered as an admitted prior art), except an improvement comprising a stationary spacer composed of material that shrinks less than the shaft of the generator interposed between the thrust plate of the thrust equalizing mechanism and the bearing blocks of its adjacent main bearing to reduce the span between said main bearings.

In the same field of endeavor, Nakamura shows (in Fig. 1) and discloses a shaft (21) of the generator and a stationary spacer (col, 2, line 1-6) interposed between a plate receiving thrust (see plate of fan) and the bearing blocks (41) of its adjacent main bearing to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Nakamura with that of AAPA to have a spacer interposed between the thrust plate of the thrust equalizing mechanism and the bearing blocks of its adjacent main bearing to be tightly supported by the frame. Nakamura however is silent to show or disclose a stationary spacer composed of material that shrinks less than the shaft of the generator.

In the same field of endeavor, Brown shows (in Figs. 2 and 34-35) and discloses a stationary spacer (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of PAPA in

view of Nakamura to have a spacer composed of material that shrinks less than the shaft of the generator interposed between the thrust plate of the thrust equalizing mechanism and the bearing blocks of its adjacent main bearing to reduce the span between said main bearings (intended use), since expansion coefficient of steel is less than that of stainless steel (see coefficient of linear thermal expansion a of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient of thermal expansion), bearings are receiving thrust force acts as thrush plate and both motor and generator have electrical machine with substantially same structure, to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 3, AAPA in view of Nakamura and in further view of Brown shows and discloses the claimed invention as applied to claim I above. References are silent to show or disclose the height of the spacer is selected such that it is operative over the temperature range of the cryogenic liquid turbine generator. However, since spacer made of steel can expanded less than 0.25% at 180 degrees C (calculated from http://www.enciineeringtoolbox.com/linear-thermal-expansion-d 1 379.html), it would have been obvious to one having ordinary skill in the art at the time the invention was made to select spacer dimensions such that it is operative over the temperature range of the cryogenic liquid turbine generator for predictable result of proper operation within 1% expansion at 180 degree, and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As for claim 5, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid turbine generator having product-lubricated main bearings separated by a span of shaft and a thrust equalizing mechanism which includes a stationary thrust plate adjacent one of the main bearings and a variable orifice defined between the thrust plate and a throttle plate affixed to the

shaft (preamble of Jepson type claim is considered an admitted prior art), except an improvement comprising 0.1 a stationary length compensator interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings, j~ wherein the spacer is composed of material that shrinks less than the shaft of the generator.

Re *(1)*, Nakamura shows (in Fig. 1) and discloses a shaft (21) of the generator and a stationary length compensator (col, 2, line 1-6) interposed between a plate receiving thrust (see plate of fan) and its adjacent main bearing (41) to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a stationary length compensator interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings by combining the teaching of Nakamura with that of PAPA to be tightly supported by the frame

Re *(2)*, Brown shows (in Figs. 2 and 34-35) and discloses a stationary length compensator (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of PAPA in view of Nakamura to have the spacer is composed of material that shrinks less than the shaft of the generator, since expansion coefficient of steel is less than that of stainless steel (see coefficient of linear thermal expansion a of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient of thermal expansion), bearings are receiving thrust force acts as thrush plate and both motor and generator have electrical machine with substantially same structure, to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by

making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 7, AAPA in view of Nakamura and in further view of Brown shows and discloses the claimed invention as applied to claim 5 above. References are silent to show or disclose the height of the thrust plate and the length compensator are selected such that it is operative over the temperature range of the cryogenic liquid turbine generator. However, since plate and spacer made of steel can expanded less than 0.25% at 180 degrees C (calculated from http://www.enpineeringtoolbox.com/linear-thermal-expansion-d 1 379.html), it would have been obvious to one having ordinary skill in the art at the time the invention was made to select spacer dimensions such that it is operative over the temperature range of the cryogenic liquid turbine generator for predictable result of proper operation within 1% expansion at 180 degree, and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boescli*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As for claim 9, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid turbine generator having product-lubricated main bearings separated by a span of shaft and a thrust equalizing mechanism which includes a stationary thrust plate adjacent one of the main bearings (preamble of Jepson type claim is considered an admitted prior art), except an improvement comprising *(1)* stationary means interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings, *(2)* wherein the spacer is composed of material that shrinks less than the shaft of the generator.

Re *(1)*, Nakamura shows (in Fig. 1) and discloses a shaft (21) of the generator and stationary means (col, 2, line 1-6) interposed between a plate receiving thrust (see plate of fan) and its adjacent main bearing (41) to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings (intended use). Therefore, it would have been

obvious to a person of ordinary skill in the art at the time the invention was made to have a stationary means interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings by combining the teaching of Nakamura with that of AAPA to be tightly supported by the frame.

Re *(2)*, Brown shows (in Figs. 2 and 34-35) and discloses a stationary means (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of AAPA in view of Nakamura to have the spacer is composed of material that shrinks less than the shaft of the generator, since expansion coefficient of steel is less than that of stainless steel (see coefficient of linear thermal expansion a of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.orcj/wiki/Coefficient of thermal expansion), bearings are receiving thrust force acts as thrush plate and both motor and generator have electrical machine with substantially same structure, to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 11, AAPA in view of Nakamura and in further view of Brown shows and discloses the claimed invention as applied to claim 5 above. References are silent to show or disclose the height of said means is selected according to desired thrust equalizing mechanism such that they operative over the temperature range of the cryogenic liquid turbine generator. However, since plate and spacer made of steel can expanded less than 0.25% at 180 degrees C (calculated from http://www.encjineerinptoolbox.com/linear-thermal-expansion-d 1 379.html), it would have been obvious to one having ordinary skill in the art at the time the invention was made to select spacer

dimensions such that it is operative over the temperature range of the cryogenic liquid turbine generator for predictable result of proper operation within 1% expansion at 180 degree, and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As for claim 13, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid pump having main product-lubricated bearings separated by a span of shaft and a thrust equalizing mechanism adjacent one of said main bearings (preamble of Jepson type claim is considered an admitted prior art), except an improvement comprising *(1)* a stationary spacer interposed between the thrust equalizing mechanism and its adjacent main bearing to reduce the span between said main bearings, *(2)* wherein the spacer is composed of material that shrinks less than the shaft of the pump.

Re *(1)*, Nakamura shows (in Fig. 1) and discloses a stationary spacer (col, 2, line 1-6) interposed between a plate receiving thrust (see plate of fan) and its adjacent main bearing (41) to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a stationary spacer interposed between the thrust equalizing mechanism and its adjacent main bearing to reduce the span between said main bearings by combining the teaching of Nakamura with that of AAPA to be tightly supported by the frame.

Re *(2)*, Brown shows (in Figs. 2 and 34-35) and discloses a stationary spacer (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of AAPA in view of Nakamura to have the spacer is composed of material that shrinks less than the shaft of the pump as in

admitted prior art, since expansion coefficient of steel is less than that of stainless steel (see coefficient of linear thermal expansion a of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient of thermal expansion), to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 14, except claim dependency, the claim contains the substantially same limitation as claim 3 and is rejected for the same reason set forth in connection with the rejection of claim 3 above, since admitted prior art described application to generator and pump as well, and shaft for motor, generator or pump would be used for the others as the same.

As for claim 15, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid pump having product- lubricated main bearings separated by a span of shaft and a thrust equalizing mechanism which includes a stationary thrust plate adjacent one of the main bearings and a variable orifice defined between the thrust plate and a throttle plate affixed to the shaft (preamble of Jepson type claim is considered an admitted prior art), except *(1)* an improvement comprising a stationary length compensator interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings, *(2)* wherein the spacer is composed of material that shrinks less than the shaft of the pump.

Re *(1)*, Nakamura shows (in Fig. 1) and discloses a stationary length compensator (col, 2, line 1-6) interposed between the thrust plate (see plate of fan) and its adjacent main bearing (41) to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a stationary length compensator interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings by combining the teaching

of Nakamura with that of AAPA to be tightly supported by the frame.

Re *(2)*, Brown shows (in Figs. 2 and 34-35) and discloses a stationary spacer (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of PAPA in view of Nakamura to have the spacer is composed of material that shrinks less than the shaft of the pump as in admitted prior art, since expansion coefficient of steel is less than that of stainless steel (see coefficient of linear thermal expansion a of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient of thermal expansion), to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 16, except claim dependency, the claim contains the substantially same limitation as claim 7 and is rejected for the same reason set forth in connection with the rejection of claim 7 above, since admitted prior art described application to generator and pump as well, and shaft for motor, generator or pump would be used for the others as the same.

As for claim 17, AAPA shows (in Figs. 1-2) and discloses, for a vertical flow cryogenic liquid pump having product- lubricated main bearings separated by a span of shaft and a thrust equalizing mechanism which includes a stationary thrust plate adjacent one of the main bearings (preamble of Jepson type claim is considered an admitted prior art), except *(1)* an improvement comprising stationary means interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings, *(2)* wherein the spacer is composed of material that shrinks less than the shaft of the pump.

Re *(1)*, Nakamura shows (in Fig. 1) and discloses stationary means (col, 2, line 1-6) interposed between the thrust plate (see plate of fan) and its adjacent main bearing (41) to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings (intended use). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a stationary means interposed between the thrust plate and its adjacent main bearing to space said adjacent main bearing from the thrust plate in order to reduce the span between said main bearings by combining the teaching of Nakamura with that of AAPA to be tightly supported by the frame.

Re *(2)*, Brown shows (in Figs. 2 and 34-35) and discloses a stationary spacer (136) composed of material (steel; col.5, line 60) that shrinks less than the shaft (1490, stainless steel; col. 22, line 22) of the motor assembly (1514) interposed between thrust receiving bearing blocks (91, 92). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of PAPA in view of Nakamura to have the spacer is composed of material that shrinks less than the shaft of the pump as in admitted prior art, since expansion coefficient of steel is less than that of stainless steel (see coefficient of linear thermal expansion a of stainless steel is 17.3 while that of steel is 11-13, fact sheet from http://en.wikipedia.org/wiki/Coefficient of thermal expansion), to separate a bearing (col. 5, line 66) and for predictable results of cost reduction by making spacer with steel since steel is relatively low cost and common as well known for those ordinary skilled in the art.

As for claim 18, except claim dependency, the claim contains the substantially same limitation as claim 11 and is rejected for the same reason set forth in connection with the rejection of claim 11 above, since admitted prior art described application to generator and pump as well, and shaft for motor, generator or pump would be used for the others as the same."

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